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EXAMINER

BLACKMAN, ROCHELLE ANN J

ART UNIT PAPER NUMBER

2851

DATE MAILED: 09/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/536,513

Applicant(s)

MATSUI ET AL.

Examiner

Rochelle Blackman

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5/25/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 2 and 6 are objected to because of the following informalities: in claim 2, lines 1-2, "reflection type polarization selecting means" should be - reflection type polarization element- -, as it is referred to in claim 1, from which claim 2 depends; and claim 6 recites the limitation "the color selecting means" in lines 2-3 of claim. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yano (JP Patent No. 2002-328460 – U.S. Patent No. 6,910,772 is being used as a translation thereof) in view of Yamagishi (U.S. Patent No. 5,777,695).

Regarding claim 1, Yano discloses an image display device (see FIG. 40) comprising: a spheroidal reflecting mirror (see 16 of FIG. 40) having an open end; a light source (see 12 of FIG. 40) provided at a first focal point of the spheroidal mirror; a polarization changing element (see 18 of FIG. 40) provided at the open end of the

spheroidal mirror; a reflection type polarization selecting element (see 19 of FIG. 40); a first fly-eye integrator (see 8 of FIG. 40) upon which light having passed by the reflection type polarization selecting element is incident; a second fly-eye integrator (see 9 of FIG. 40) upon which the light having passed by the first fly-eye integrator is incident; a reflection type spatial light modulating element (see 31 of FIG. 40 and 44B) illuminated with the light having passed by the fly-eye integrator to modulate the illumination light correspondingly to an image to be displayed; a reflector (see 14 of FIG. 40) to reflect the light returned by the light selecting means to the second fly-eye integrator, to thereby direct the light back to the reflection type spatial light modulating element; and a projection optical system (see 67 of FIG. 44B) that projects the light incident via the projection optical means as image projection light.

Regarding claim 3, Yano discloses the device according to claim 1, wherein the reflection type polarization selecting element is a reflecting type circular polarizing plate (see col. 24, line 49-51) and the polarization changing element is a quarter wave plate (see col. 24, line 45).

Regarding claim 5, Yano discloses the device according to claim 1, wherein the reflection type spatial light modulating element is illuminated via a color selecting means (see 43 of FIG. 41 and col. 24, line 66 to col. 25, line 4) that temporally splits the light from the light source into color components and the illumination light is modulated based on image information corresponding to color components selected by the color selecting means.

Regarding claim 7, Yano discloses the device according to claim 1, further comprising a relay lens (see 49 of FIG. 40) through which light reflected by the reflector toward the first fly-eye integrator is passed, the first and second fly-eye integrators including fly-eye lenses equal in size to each other and disposed at a constant pitch (see arrangement of lenses of 8 and 9 in FIG. 40), a central one of the plurality of fly-eye lenses (see one of the central fly-eye lenses of 9 in FIG. 40) being displaced a distance equal to a quarter of the fly-eye lens pitch in relation to the optical axis of the relay lens in at least one direction perpendicular to the optical axis.

Regarding claim 8, Yano discloses the device according to claim 7, wherein: in the first and second fly-eye integrators including the fly-eye lenses equal in size to each other and disposed at the constant pitch, the central one of the plurality of fly-eye lenses (see one of the central fly-eye lenses of 9 in FIG. 40) being displaced a distance equal to a quarter of the fly-eye lens pitch in relation to the optical axis of the projection optical system in at least one direction perpendicular to the optical axis; and the optical axis of the projection optical system is aligned with that of the relay lens (see optical axis running through 49 in FIG. 40).

Regarding claim 9, Yano discloses the device according to claim 7, wherein the first and second fly-eye integrators are positioned at the contour with reference to the optical disk of the relay lens so that the central one of the plurality of fly-eye lenses is in a position displaced a distance equal to a quarter of the fly-eye lens pitch in relation to the optical axis of the relay lens in at least one direction perpendicular to the optical axis

(see one of the centrally fly-eye lenses of 9 relative to the optical axis running through 49 in FIG. 40).

Regarding claim 1, Yano discloses a light selecting means (see 32 of FIG. 40) for splitting the light reflected by the reflection type spatial light modulating element into light to be reflected and light to be directed to a projection optical system correspondingly to the modulation by the reflection type spatial light modulating element in the embodiment of FIG. 40, but does not appear to disclose light being “returned to the second fly-eye integrator” upon splitting the light reflected by the reflection type spatial light modulating element.

Yano teaches in the embodiment of FIG. 45B, a light selecting means (see 32 of FIG. 45B) for splitting the light reflected by the reflection type spatial light modulating element into light to be returned to the second fly-eye integrator and light to be directed to a projection optical system correspondingly to the modulation by the reflection type spatial light modulating element (see col. 27, lines 28-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a light selecting means that returns light to the second fly-eye integrator upon splitting the light reflected by the reflection type spatial light modulating element in the embodiment of FIG. 40, as taught in the embodiment of FIG. 45B for the purpose of recycling the light making an efficient use of the light emitted from the light source.

Regarding claims 1 and 2, Yano teaches a quarter wave plate (see 50 of FIG. 40) “provided near a second focal point of the spheroidal mirror”; the quarter wave plate and the “reflector” disposed “inside a minimum circle of confusion defined by light emitted from the light source and condensed by the spheroidal reflecting mirror to near the second focal point” (see location of 14 and 50 in FIG. 40); and the quarter wave plate and reflector formed “integrally with each other” (see 14 relative to 50 in FIG. 40), but does not appear to disclose the reflection type polarization selecting element provided “near a second focal point of the spheroidal mirror”; the reflection type polarization selecting element and reflector being disposed “inside a minimum circle of confusion defined by light emitted from the light source and condensed by the spheroidal reflecting mirror to near the second focal point”; and the reflection type polarization selecting means and reflector formed “integrally with each other”.

Yamagishi teaches providing a reflection type polarization selecting element (see 6 of FIG. 1) provided near a second focal point of an elliptical mirror (see col. 7, lines 61-63); the reflection type polarization selecting element and a reflector (see 12 of FIG. 1) being disposed inside a minimum circle of confusion (see 11 of FIG. 1) defined by light emitted from the light source and condensed by the elliptical reflecting mirror to near the second focal point (see location of 6 and 12 in FIG. 1); and the reflection type polarization selecting means and reflector position within close proximity to each other (see 6 and 12 in FIG. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provided the reflection type polarization selecting element “near

the second focal point" of the spheroidal mirror and dispose the reflection type polarization selecting element and the reflector "inside a minimum circle of confusion defined by light emitted from the light source and condensed by the spheroidal reflecting mirror to near the second focal point" in the Yano reference, as taught by Yamagishi for the purpose of utilizing light emitted from the light source at high efficiency, as well as form the reflection type polarization means and reflector "integrally with each other", for the purpose making decreasing the optical axis length of the illumination system in the image display device, thus making the image display device more compact.

Regarding claim 4, Yano discloses the polarization changing element is a quarter wave plate (see col. 24, line 45), but does not appear to disclose the polarization changing element is a "half wave plate".

Yamagishi teaches a half wave plate can be used as well as a quarter wave plate for transforming a direction of polarization (see col. 8, lines 48-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a "half wave plate" as the polarization element in the Yano reference, as taught by Yamagishi for the purpose of transforming the light from a circularly polarized orientation to linearly polarized orientation.

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yano (JP Patent No. 2002-328460 – U.S. Patent No. 6,910,772 is being used as a translation thereof) in view of Yamagishi (U.S. Patent No. 5,777,695) as applied to claim 1 above, and further in view of Lee (U.S. Patent Application Publication No. 2002/0085179).

Yano and Yamagishi disclosed the claimed invention except for wherein “a plurality of the reflecting type spatial light modulating elements is provided, and each of them is illuminated via the color selecting means that temporally splits the light from the light source into color components and modulates the illumination light based on image information corresponding to the color components selected by the color selecting means for each of them”.

Lee teaches providing a plurality of the reflecting type spatial light modulating elements (see 56 and 57 of FIG. 6), and each of them is illuminated via a color selecting means (see 60 of FIG. 6) that temporally splits the light from the light source into color components and modulates the illumination light based on image information corresponding to the color components selected by the color selecting means for each of them.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a “plurality of the reflecting type spatial light modulating elements” illuminated via “a color selecting means” in the combined Yano and Lee reference, as taught by Lee for the purpose of improving color purity and optical efficiency (see pg. 2, paragraph [0026]).

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yano (JP Patent No. 2002-328460 – U.S. Patent No. 6,910,772 is being used as a translation thereof) in view of Yamagishi (U.S. Patent No. 5,777,695) as applied to claim 1 above, and further in view of Fujimori et al. (U.S. Patent No. 6,631,039).

Yano and Yamagishi disclosed the claimed invention except for wherein for each of the first and second fly-eye integrators, there is provided at the contour thereof “a positioning portion which is a reference point for positioning”.

Fujimori teaches providing for each of first and second fly-eye integrators (see 140 and 150 of Figs. 1, 2, 4A-B, 6A, and 6B-E), at the contour thereof a positioning portion (see 400 of Figs. 4-6), which is a reference point for positioning.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide for each of the first and second fly-eye integrators, a “positioning portion” at the contour thereof, in the combined Yano and Yamagishi reference, as taught by Fujimori for the purpose of facilitating alignment of optical parts of an illumination system in the “image display device” (see col. 1 lines 46-49).

Allowable Subject Matter

1. Claims 11 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter:

Claim 11 has been found to be allowable because the prior art of record either alone or in combination neither discloses nor makes obvious the image display device comprising the particular features of a first lens barrel that positions and holds the spheroidal reflecting mirror, reflection type polarization selecting element and reflector, positioning the first fly-eye integrator in relation to the spheroidal reflecting mirror while positioning the fly-eye integrator by the positioning portion and holding the fly-eye integrator and a second lens-barrel that positions and holds the spheroidal reflecting mirror, reflection type polarization selecting element and reflector and positions the second fly-eye integrator in relation to the reflection type spatial light modulating element while positioning the second fly-eye integrator by the positioning portion and holding the second fly-eye integrator, in combination with the other particular combination of features recited in claim 11, further in combination with particular combination of features recited in claims 1, 7, 9, and 10.

Claim 12 has been found to be allowable because it depends upon claim 11.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rochelle Blackman whose telephone number is (571) 272-2113. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Rochelle Blackman
Patent Examiner

RB